

MINUTE MAN[®]

UNINTERRUPTIBLE POWER SUPPLIES

MODELS DESCRIBED IN THIS MANUAL

AT650, GS650 (650VA)
AT800, GS800 (800VA)
AT1200, GS1200 (1200VA)
AT1600, GS1600 (1600VA)
AT2300, GS2300 (2300VA)

OWNER'S MANUAL



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INTRODUCTION

Congratulations on your purchase of a MINUTEMAN "AT" Series Synchronized Sinewave Uninterruptible Power Supply (UPS). Each unit is designed to provide superior, total power protection for personal computers, telephone systems and any other sensitive or critical electronic equipment against all commercial power anomalies. These models provide light and audible alarm indications, so the user will know the status of both commercial power and the MINUTEMAN "AT" Power Supply at all times. Each unit is designed to be maintenance free and to provide years of excellent service. Other features of the "AT" Series include:

- Light weight and small footprint
- Quiet operation
- High non-linear current capability (Crest Ratio = 3:1)
- Computer grade sinewave output
- LAN Communications Port

RECEIVING INSPECTION

Remove and inspect the unit for shipping damage. If damage is found, immediately notify the carrier and your dealer. If no damage is found save both the shipping container and the packing foam in case the unit may later need to be returned to the factory or shipped to another location.

WARRANTY REGISTRATION

Locate your warranty registration card in the back of this manual and complete and return within 10 days of receipt of the unit(s) to register your warranty. Failure to register your warranty renders it non-valid.

IMPORTANT SAFETY INSTRUCTIONS (Save these instructions)

- Units in this manual are intended for installation in a temperature-controlled, indoor area free of conductive contaminants.
- Read all instructions carefully before operating the UPS. All operating instructions should be followed and all cautions must be adhered to.
- **CAUTION** -- UPS units use batteries for generation of AC voltages, so output receptacles may be electrically hot even when the unit is not connected to commercial power. Trained service personnel should perform all repairs, since an electrical shock hazard exists.
- **CAUTION** -- Do not remove the cover, there are no user serviceable parts inside.
- **CAUTION** -- The 3-wire plug supplied with the unit provides earth ground for the UPS unit chassis to prevent electrical shock. Plug the UPS unit into a 3-wire grounding type, commercial receptacle with grounding conductor connected to earth ground at the service equipment. Removal of the ground pin from the plug or use of a 3-wire-to-2-wire adapter will defeat this safety feature and may result in a shock hazard. Additionally, if

the plug is removed to simulate a power failure (not recommended), do not touch the plug conductors or the chassis while the lug is removed.

- **CAUTION** -- Do not allow water or any foreign object to enter the UPS. In case this occurs, immediately turn the unit power switch off and unplug the MINUTEMAN from the commercial receptacle.
- Servicing of batteries should be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from the batteries.
- When replacing UPS batteries, use sealed lead-calcium rechargeable batteries with the same voltage and ampere-hour rating as those contained in the units. These batteries have pressure operated safety vents.
- **CAUTION**
 1. Do not dispose of batteries in a fire. They may explode.
 2. Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes, and may be toxic.
 3. Battery systems can present a risk of electrical shock and high short circuit current. The current capability of each battery system is sufficient to burn large wire or tools very rapidly, producing molten metal. The following precautions should be observed when working on batteries:
 - a. Disconnect charging source prior to connecting or disconnecting battery terminals.
 - b. Remove watches, rings or other metal objects.
 - c. Use tools with insulated handles.
 - d. Do not lay tools or any metal parts on top of batteries.
 - e. Wear protective gloves, eyewear, and boots.
 - f. Determine if the battery is inadvertently grounded. If inadvertently grounded, remove source of ground. Contact with any part of a grounded battery can result in an electrical shock. The likelihood of such shock will be reduced if such grounds are removed during installation and maintenance.

SELECTION OF UPS LOCATION

Select a location that will provide good air circulation for the UPS. Do not cover the unit air vent holes or restrict airflow in any way. The unit must have good air circulation at all times.

- Avoid locations near heating devices.
- Avoid locations near water or excessive humidity.
- Avoid locations where the unit is exposed to direct sunlight.

- Route unit power-cords so it cannot be walked on or damage.

ELECTRICAL SPECIFICATIONS

Electrical Specifications									
Model	Rated Output		Freq. HZ	Input VAC/A	Output VAC/A	Battery System VDC	Back Up Full Load	Time (Min) Half Load	Max Heat Dissipation BTU/HR
	VA	Watts							
AT650	650	455	60	120/6.0	120/5.4	24	6	15	311
GS650	650	455	50	220/3.3	220/3.0	24	6	15	311
AT800	800	560	60	120/7.4	120/6.7	48	8	20	382
GS800	800	560	50	220/4.0	220/3.6	48	8	20	382
AT1200	1200	840	60	120/11.1	120/10.0	48	7	18	573
GS1200	1200	840	50	220/6.1	220/5.5	48	7	18	573
AT1600	1600	1120	60	120/14.8*	120/13.3*	72	8	20	765
GS1600	1600	1120	50	220/8.1	220/7.3	72	8	20	765
AT2300	2300	1610	60	120/21.3	120/19.2	72	4	10	1099
GS2300	2300	1610	50	220/11.6	220/10.5	72	4	10	1099

* Input/Output specifications above for model AT1600 are applicable when a 20-ampere power plug (NEMA 5-20P) is utilized (non-standard). For a NEMA 5-15P plug (standard), derate input to 120VAC/12 Amperes and derate output in "AC Normal" mode only to 120VAC/10.8 Amperes.

OTHER ELECTRICAL SPECIFICATIONS

Electrical Specifications		
Input Voltage (AC Mode Function)	120VAC \pm 15 VAC; 225 VAC \pm 35VAC	
Input Frequency Deviation for Synchronization	\pm 5%	
Inrush Current	1.5xRated	
Surge Protection	3 way, meets IEEE STD 587	
RFI/EMI Filtering	Both Common & Normal Modes	
Transfer	<u>120VAC Units</u>	<u>220VAC Units</u>
Brownout Transfer	105VAC	190VAC
Brownout AC Return	110VAC	200VAC
Over-voltage Transfer	135VAC	260VAC
Over-voltage AC Return	130VAC	250VAC
Transfer Speed	2ms Maximum	
Inverter Crest Factor (Non-Linear Load)	3:1	
Inverter Waveform	Synchronized Computer Grade Sinewave	
Harmonic Distortion	Less than 3% THD at full linear load	
Inverter Voltage Regulation		
Static	\pm 3%	
Dynamic	\pm 5% with 50% Linear Step Load Change	
Inverter Frequency Regulation	0.5%	
DC-to-AC Efficiency (Full Load)	80%	
Overload/Short Circuit Protection	Yes, Electronic and Fuse	
Discharged Battery Recharge Time	8 Hours (95% of Full Charge)	

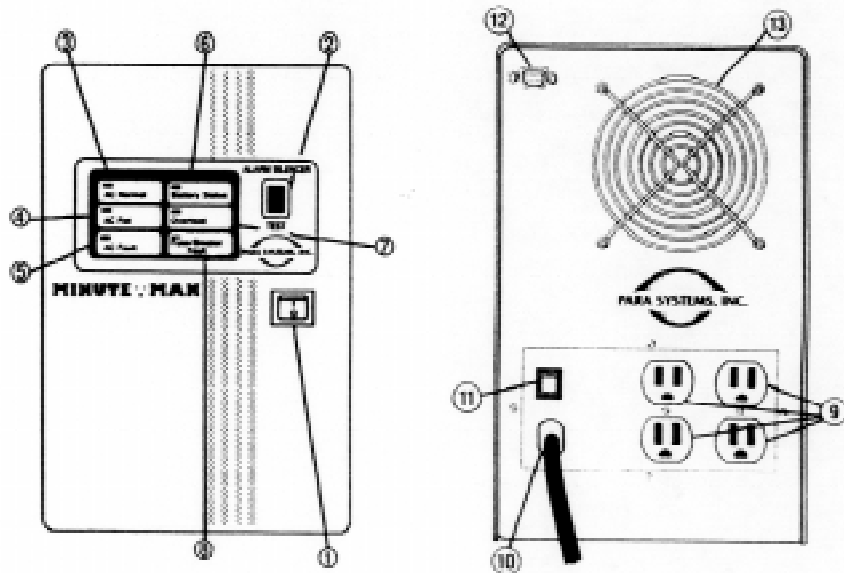
PHYSICAL SPECIFICATIONS

Physical Specifications			
Model	Net Weight (LBS)	Shipping Weight (LBS)	Dimensions (L x W x H) (In.)
AT650	36.0	39	16.5 x 6.5 x 9.7
AT800	42.7	46	18.1 x 6.5 x 9.7
AT1200	62.4	67	19.0 x 7.9 x 13.3
AT1600	77.3	82	19.0 x 7.9 x 13.3
AT2300	92.1	96	21.7 x 7.9 x 13.9

All Models:

Operating Temperature	0°C to 40°C (32°F to 104°F)
Storage Temperature	-15°C to 40°C (5°F to 104°F)
Relative Humidity	95% maximum at 25°C Non-Condensing
Audible Noise	40 dB ANSI Scale A, at 3'

UNIT DESCRIPTION



AT SYNCHRONIZED SINEWAVE MODELS

1. Power Switch.
2. Alarm Silencer/Test momentary rocker switch.
3. AC Normal LED (Green): On when commercial voltage is present and in range (AC Normal Mode), off otherwise.
4. AC Fail LED (Red): On when commercial power is lost and stays on until commercial power returns, off otherwise.

5. AC Fault LED (Yellow/Red): Yellow when commercial input voltage is lost or too low or input frequency shifts drastically and unit switches to inverter mode. Red when commercial input voltage is too high and unit switches to inverter mode. Both stay on until fault is cleared. Off as long as commercial voltage is present and in range, and frequency is stable.
6. Battery Status LED (Yellow/Red): Yellow at low battery warning. Red at low battery cutoff for one (1) second. Off otherwise.
7. Overload LED (Red): On when inverter shuts down because of unit overload or because input frequency is far out of range, off otherwise. Overload LED stays on until unit power switch is turned off and back on with conditions corrected.
8. Fuse/Breaker Fault LED (Red): On when AC fuse (AT650, AT800 or AT2300) is blown or AC Breaker (AT1200 or AT1600) is tripped, off otherwise.
9. Output Receptacles, 120VAC units: 4 NEMA 5-15R receptacles on all units except AT2300. AT2300 has 6.
10. Power Cord, 120VAC units: AWG 18/3 (AT650 and AT800) or AWG 14/3 (AT1200 and AT1600) SJT with NEMA 5-15P Plug (standard) or AWG 12/3 SJT (AT2300) with NEMA L5-30P Plug.
11. Input Fuse Holder/Breaker: At650, AT800 and AT2300 units use fuse and fuse holder at input. AT1200 and AT1600 units use AC circuit breaker at input.
12. LAN Communications Port (DB9 Female): Standard on all units.
13. Cooling Fan: Models AT1200, AT1600 an AT2300 only. Smaller models are convection cooled.
14. Audible Alarm (Internal): Sounds twice every two seconds in normal inverter mode after an initial five (5) second delay; sounds four (4) times per second at low battery warning.

GS MODELS

Each GS model is the same as the comparable AT series model except for power plugs and receptacles. GS units use global sockets (2 on GS650 and GS800, and 4 on GS1200 and larger units) on all models instead of the receptacles shown in unit pictorials. These models use an IEC320 power cord socket with user selectable international cord sets.

INSTALLATION AND PRELIMINARY TESTING

- Ensure that the UPS power switch is off ("0" position) and no load is connected to the UPS output receptacles.
- Plug the UPS power plug into a grounded commercial power receptacle with proper supply voltage and frequency for the specific UPS model under test. For GS models, first plug the cord set into the UPS IEC320 socket.

- Turn on the UPS power switch ("1" position) and verify that the "AC Normal" LED (Green) illuminates after a short delay. This is the AC Normal Mode. Leave the UPS in this position for approximately 30 seconds minimum.
- Depress the UPS "Test/Alarm Silencer" rocker switch toward the "Test" position and hold for 10 to 15 seconds. Verify that the audible alarm sounds after a five (5) second delay (twice every two (2) seconds), the "AC Fault" LED turns yellow and the "AC Normal" LED extinguishes. This is the Normal Inverter Mode (battery operation).
- Release the test switch and unit will return to the AC Normal Mode after a short delay.

NOTE: If any condition experienced during the above test procedure was not as described, contact your supplier or Para Systems, Inc. customer service and report any problem observed. If tests proceeded normally, the UPS is ready for load testing.

LOAD TESTING

- Turn off the UPS power switch and plug your critical load(s) into the UPS output receptacle(s). Then turn the power switch back on and turn on your loads.
- To verify that the UPS will accommodate the total load added:
 1. Ensure that data is saved prior to test in case power is lost during test.
 2. Depress the MINUTEMAN test switch for 10 to 15 seconds while running maximum load power. This testing should be repeated 5 to 10 times.
 3. Verify that UPS and load functions were proper during this testing (see items under INSTALLATION AND PRELIMINARY TESTING for UPS function). If all functions were proper, the UPS is ready for operation.

OPERATION

After testing above, keep commercial power applied to the UPS with the power switch on for a minimum of six (6) hours to permit full battery recharge. Loads can be powered during recharge. For daily operation you can turn on all UPS loads with the UPS power switch or you can leave the UPS on and turn on your critical equipment each day. With the standard UPS configuration, the battery charger runs only when the power switch is on. However, turning the unit off each night and over the weekend will create no problems for the batteries or the charger.

When a brownout, power interruption, power outage, over-voltage condition or a drastic frequency shift occurs or the AC fuse blows (AT650, AT800 or AT2300) or input breaker trips (AT1200 or AT 1600), the MINUTEMAN UPS will switch to the normal inverter mode - "AC Normal" LED will extinguish, audible alarm will sound after a five (5) second delay and the LED(s) indicating the problem will illuminate. A brownout will cause the "AC Fault" light to turn yellow, a power interruption or outage will cause the "AC Fault" light to turn yellow and the "AC Fail" light to illuminate (RED), an over-voltage condition will cause the "AC Fault" light to turn red, a drastic

frequency shift will cause the "AC Fault" light to turn yellow and a blown fuse or tripped circuit breaker will cause the fuse/breaker light to illuminate (RED).

The audible alarm can be silenced in both the "Normal Inverter" and the "Low Battery Warning" modes by depressing the "Test/Alarm Silencer Switch" toward the "Alarm Silencer" position. The alarm will automatically reset upon return to the "AC Normal" mode, providing an audible indication of the next power problem. For long duration power outages or problems, the unit will provide a low battery warning a minimum of two (2) minutes prior to low battery shutdown. At low battery warning the "Battery Status" light will turn yellow and the audible alarm will turn back on, if silenced previously. The alarm speed at low battery warning is more rapid -- four (4) times per second.

If you have not already saved your data and turned off your critical loads, you must do so at this time. The UPS will shut off automatically to protect the internal batteries from excessive discharge. However, to conserve battery power you can turn off the UPS power switch after your data is saved and loads are ready to be turned off. When commercial power is restored, switch the MINUTEMAN power switch back on if it was turned off previously. The "AC Normal" LED will come on after a short delay. Return your system to operations and the MINUTEMAN System will automatically recharge the internal batteries during system operation.

Since most commercial power outages are of short duration, commercial power will probably be restored before the low battery warning. IF COMMERCIAL POWER RETURNS BEFORE THE WARNING SIGNAL, THERE IS NO NEED TO SHUT DOWN YOUR SYSTEM AT ALL. The MINUTEMAN will switch back to normal AC mode operation automatically.

During normal AC mode operation, the MINUTEMAN unit will quietly protect your system from power surges, voltage spikes and noise interference. No alarms will sound and the "AC Normal" indicator light will remain "ON" during this operation.

SYSTEM BATTERIES

The batteries used internally in AT Series MINUTEMAN units are sealed, maintenance free, lead-acid batteries with electrolyte totally absorbed in the plates and separator material. These batteries can be used in any position, except upside down. For maximum battery life, batteries should be maintained at as cool a temperature as is practical indoors at proper trickle charge voltage. The most effective charging temperature range is 41°F to 95°F. However, batteries can be charged within the range of 32°F to 104°F (0°C to 40°C) without any detrimental effects. Expected float life of the batteries is 3 to 6 years at 85°F. We recommend replacement after 3 years of use. Replacement batteries can be purchased from Para Systems, Inc. or from your local distributor or dealer. If the UPS must be stored, leave it plugged in with commercial power applied and the power switch on for 24 hours prior to storage. Store the unit in a cool dry location. For extended storage the unit must be removed from storage and recharged as above every 4 months.

If batteries require replacement, refer to the "Important Safety Instructions" section on page 1 of this manual. A trained service technician who is familiar with batteries and UPS systems must accomplish replacement. Used batteries should be provided to a recycling center for reclamation of the lead.

BATTERY /SYSTEM CHECKOUT

To verify proper system function and battery condition, the user is encouraged to engage the test switch periodically. Normal indications as specified should be observed. If the system goes immediately to the low battery-warning mode the batteries should be replaced.

UPS MONITORING CONFIGURATIONS

All of these models provide an UPS monitoring capability which will allow direct interface with many different computer hardware/software configurations. This capability permits an unattended, orderly shut down of the computer system when commercial power is lost for a long period. Some configurations also provide for shut down of the UPS after the computer has been shut down, thereby conserving UPS battery capability.

Following is a partial list of systems with which the monitoring capability exists. Contact Para Systems Customer Service Department for a more complete, up to date list. In addition to those standard configurations listed below, Para Systems also offers its own software package, "Network Manage", which functions with Novell, Unix, OS/2, LAN Manager, LAN Server and MacIntosh Operating Systems. Network Manager offers many advantages over existing UPS monitoring packages.

Finally, for systems which do not have UPS interface capability, user software can be written to read UPS status and provide for system shut down. Software specialists should contact Para Systems, Inc. for more information. The standard UPS DB9 PIN out is provided below for your information.

UPS DIRECT INTERFACE CONFIGURATIONS

- * Novell for AT compatible computers
- Novell for PS/2 computers with mouse port connector
- Altos Unix/Pick/Xenix with 1/4" stereo jack
- Same except for low battery warning response
- DTS Servers running Banyon Vines
- Servers running Banyon Vines
- Servers running Banyon Vines/286, Vines/386
- Prime 2350/2450
- Convergent/Unisys
- Microsoft LAN Manger
- Convergent Mighty Frame/Miniframe
- LANTastic

*This interface configuration functions with existing Novell UPS monitoring board, SS keycard or Disk Coprocessor Board. Para Systems Monitoring Board (MB1) is available for new installations which do not already have an add on monitoring board.

UPS DB9 PIN OUT

PIN 2 -- SIMULATED CLOSURE to pin 8 at Utility Failure

PIN 3 -- SIMULATED CLOSURE to Pin 8 at Low Battery Warning

PIN 4 -- UPS INVERTER SHUTDOWN: When a high (+5VDC minimum) is provided for 10 msec.

PIN 5 -- SIGNAL GROUND

PIN 8 -- COMMON RETURN FOR PINS 2 AND 3

SERVICE

If any problems are observed with your MINUTEMAN AT Series UPS, contact your supplier or Para Systems, Inc. Customer Service Department. Prior to calling for service, please write down and be prepared to discuss all unit light and audible indications in each mode (AC and Inverter) and whether or not the unit supplies power in either mode. Below is a guide to assist you in locating some common problems.

Do not remove the unit cover or attempt to service this unit. There are no user serviceable components inside. Unauthorized service will void the warranty.

COMMON UPS PROBLEMS

- No normal AC mode function. "AC Fault", "AC Fail" and "Fuse/Breaker Fault" LEDs will provide an indication of the power problem.
 1. No power available at commercial receptacle.
 2. Commercial voltage is too low or too high. Report this problem to your local utility company.

Acceptable ranges are:

120VAC units -- 110VAC to 130VAC

208/220/230/240VAC units -- 200VAC to 250VAC

3. AC fuse blown (AT650, AT800 or AT2300) or AC breaker tripped (AT1200 or AT1600). Replace fuse if it is blown.

CAUTION: Turn off the MINUTEMAN power switch and disconnect the power plug from the commercial receptacle before removing the AC fuse from the holder. Inspect the fuse carefully, since it is sometimes difficult

to identify a bad slow blow fuse visually. If the fuse is blown, replace it with a fuse of the same type and ratings.

Reset breaker if tripped.

- Unit drops or reboots computer but continues to run in Inverter Mode. Unit is slightly overloaded. Disconnect some of the load and try again.
- Unit goes immediately to low battery warning. Batteries are bad or require a charge.
- Unit goes off when commercial power is interrupted -- no Inverter Mode function. Batteries are disconnected or bad or internal battery fuse is blown.

POLICY AND INSTRUCTIONS FOR RETURN OF PRODUCT TO PARA SYSTEMS, INC.

If product must be returned to Para Systems, Inc. for any reason:

- Call Para Systems at (972) 446-7363 and ask for Customer Service.
- Describe the problem or reason for return and you will be given a Return Material Authorization Number (RMA #). This number **must** be placed on the shipping carton, preferably on the return shipping label. The RMA # on the carton will ensure prompt handling when received at Para Systems, Inc.
- Pack the unit for shipment in the original carton and foam as received. Other packaging methods can result in damage to the unit.
- Enclose the name and telephone number of the person who can authorize repair charges inside the carton or packing list folder. Also include your current address for product return.
- Return the unit freight prepaid to Para Systems headquarters at the address shown on the front of this brochure. COD shipments will not be accepted.
- If repair of the product is Para Systems, Inc. responsibility, per the warranty statement, there will be no charge for the repairs and the product will be returned to you, freight prepaid, provided the unit(s) was returned in the original shipping carton and foam. If other packing methods used result in unit damage during shipment, this repair will be at your expense. Additionally, if your packaging is not deemed usable for return of the product to you, you will incur a \$10 charge for a new box and foam.
- If the repair of the product is not Para Systems, Inc. responsibility, Para Systems will advise you of the estimated repair charges by telephone for your authorization. Should you choose to not have the unit repaired, you will incur a repair estimate charge of \$15 only. All products will be returned COD for the amount of the repair or repair estimate plus shipping and handling.

PARA SYSTEMS, INC.
1455 LeMay, Carrollton, TX 75006

Tel: (972) 446-7363
Fax: (972) 446-9011

LIMITED PRODUCT WARRANTY

PARA SYSTEMS, INC. (PARA SYSTEMS) warrants that this product will be free from defective material and workmanship for a period of two years from the date of the original retail purchase by the end user provided that the warranty registrations card is completed and returned PARA SYSTEMS within ten (10) days of purchase. PARA SYSTEMS or its designated representative will repair, or at PARA SYSTEMS' option, replace any product that has been returned by the purchaser and is confirmed by PARA SYSTEMS to be defective.

Fuses and damage from lightning and over-voltage in excess of specification are not warranted and are the customer's responsibility. This warranty shall be null and void if this product has been altered, opened without authorization, misused or damaged by accident, misapplication, abuse, fire, flood or other disaster.

PARA SYSTEMS SHALL NOT BE LIABLE FOR DIRECT, INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR OTHER TYPES OR DAMAGES RESULTING FROM THE USE OF THIS PRODUCT OTHER THAN THE LIABILITY STATED ABOVE. THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTIES EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MECHANABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

PLEASE KEEP THIS DOCUMENT FOR YOUR RECORDS

Model # _____ Date Purchased _____

Warranty Registration

Model # _____ Serial # _____

Dealer Name _____

City/State _____ Zip _____

Protected Equipment _____ Date Purchased _____

Your Name _____

Your Company's Name (if applicable) _____

Address _____

City/State _____ Zip _____

Your Telephone # (_____) _____

This registration must be returned within ten (10) days after purchase to PARA SYSTEMS, INC. or the warranty is not valid.